

CSc 3320: Systems Programming

Spring 2021

Homework

1: Total points 100

Submission instructions:

1. Create a Google doc for each homework assignment submission. 2. Start your responses from page 2 of the document and copy these instructions on page 1.
3. Fill in your name, campus ID and panther # in the fields provided. If this information is missing in your document TWO POINTS WILL BE DEDUCTED per submission.
4. Keep this page 1 intact on all your submissions. If this *submissions instructions* page is missing in your submission TWO POINTS WILL BE DEDUCTED per submission.
5. Each homework will typically have 2-3 PARTS, where each PART focuses on specific topic(s).
6. Start your responses to each PART on a new page.
7. If you are being asked to write code copy the code into a separate txt file and submit that as well.
8. If you are being asked to test code or run specific commands or scripts, provide the evidence of your outputs through a screenshot and copy the same into the document.
9. Upon completion, download a .PDF version of the document and submit the same.

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PART 1

Answer the following questions briefly. Provide clear and succinct reasoning.

Points per question = 5

1. Tell the differences between Unix and Linux. Then please list some operating systems (at least three) which belong to Unix but not Linux.

Unix is an original operating system developed by AT&T, and is more often than not a catchall term for a family of derived operating systems. Linux refers to the GNU/Linux operating system.

MacOS, Xenix, Darwin

2. What is the pipe mechanism in UNIX? And show one command using pipe and explain how the pipe works in it?

A form of redirection that combines two or more commands where the output of one becomes the input of the next.

The command `$ ls -l | more`

It takes the output of `$ls -l` and uses it as the input of `more`.

3. In a Linux system, you can issue the command **ls /** to check the sub directories under root. Please describe the meanings of directory `/bin`, `/dev`, `/boot`, `/usr`, `/etc`, `/mnt`, `/sbin`, `/var` separately. For example, you can say that `/bin` contains binary executable files.

`/bin` is the standard subdirectory of the root directory, `/dev` holds special/device files, `/boot` holds the files that boots up the OS, `/usr` is the home directory of the user, `/etc` holds all the system config files and what not, `/mnt` is used for temporary mount points for storage devices, `/sbin` holds executable programs, `/var` holds files that the system writes data/variables on while running.

4. What is the meaning of Multitask and Multi-user in a Unix system?

Multitasking is self explanatory, it means the system can run two or more

processors at the same time. Multi-user means the system can have two or more users running programs at the same time.

5. What does -rwxr-xr-x mean in terms of permissions for a file? What is the exact unix command (with the octal representation) for changing the permissions to this setting?

Owner can read, write, and execute file, Group can read and execute, world can execute.

The exact unix command is through chmod

400-Read by owner, 200- Write by owner, 100-Execute by owner,

040-Read by group, 020-Write by group, 010-Execute by group

004- read by world, 002-write by world, 001-Execute by world

6. In class, you have learned the meaning of read, write and execute permission for regular files. However, these permissions are also applied to directories. So please describe the meaning of read, write, and execute permission for directory.

Same way as files, chmod with access class, operator, and access type works for directories.

Part II-a

Regular Expression

**Find outcomes for each given basic/extended regular expression
(maybe multiple correct answers)**

Points per question: 2.5

Example:

'ab+a' (extended regex)

Answer: *aba , abba ; Pattern : The matched string should begin and end with 'a' and 'b' occurs at least once between leading and ending 'a')*

Note: 7) to 10) are basic regexes; Note: 11) to 18) are extended regexes.

7) 'a[ab]*a'

aa

8) 'a(bc)?'

abc

9) '[ind]*'

i

10) '[a-z]+[a-z]'

aa

11) '[a-z] (\+[a-z])+'

a+a

12) 'a.[bc]+'

ab

13) 'a.[0-9]'

14) '[a-z]+[\.\?!\]'

15) '[a-z]+[\.\?!]\s*[A-Z]'

16) '(very)+(cool)?(good|bad) weather'

17) '-?[0-9]+'

18) '-?[0-9]*\.[0-9]*'

Part II-b

Regular Expression

Write down the extended regular expression for following questions.

E.g. Social security number in the format of 999-99-9999. Answer:

[0-9]{3}-[0-9]{2}-[0-9]{4}

Points per question: 5

19) Valid URL beginning with "http://" and ending with ".edu" (e.g. <http://cs.gsu.edu>, <http://gsu.edu>)

20) Non-negative integers. (e.g. 0, +1, 3320)

21) A valid absolute pathname in Unix (e.g. /home/yulong4, /test/try.c)

22) Identifiers which can be between 1 and 10 characters long, must start with a letter or an underscore. The following characters can be letters or underscores or digits. (e.g. number, _name1, isOK).

23) Phone number in any of the following format: 9999999999,999-999-9999, (999)-999-9999. (Note: all of these formats should be matched by a single regular expression)

Part III

Programming

Points per question: 15

24. Create a file named homework_instructions.txt using VI editor and type in it all the submission instructions from page1 of this document. Save the file in a directory named *homeworks* that you would have created. Set the

permissions for this file such that only you can edit the file while anybody can only read. Find and list (on the command prompt) all the statements that contain the word POINTS. Submit your answer as a description of what you did in a sequential manner (e.g. Step1 ... Step 2... and so on..). Add a screenshot to your answer as a proof of evidence.